

CHEN ET AL. - 10/670,795
Client/Matter: 071469-0306049

REMARKS

Claims 1-146 are currently pending. By this Amendment, no claims are amended, claims 1-92 and 120-143 are withdrawn from consideration and claims 144-146 are newly added. Support for the newly added claims may be found, for example, in paragraph [0103] in the specification. No new matter is added. Reconsideration in view of the above-outlined amendments and the following remarks is respectfully requested.

Claims 93-104 and 106-119 were rejected under 35 U.S.C. § 102(e) over U.S. Patent No. 6,666,986 to Vaartstra. This rejection is respectfully traversed.

Vaartstra discloses a supercritical etching composition and method for etching an inorganic material of a semiconductor-based substrate. The method includes providing a semiconductor-based substrate having an exposed inorganic material and exposing the substrate to a supercritical etching composition, whereby exposed inorganic material is removed from the substrate. The supercritical etching composition includes a supercritical component, which may or may not be capable of etching a particular exposed inorganic material. In one embodiment, the supercritical etching composition includes a supercritical component, which is not capable of etching a particular exposed inorganic material, and a nonsupercritical etching component, which is capable of etching the particular exposed inorganic material. In another embodiment, the supercritical etching composition includes a supercritical component, which is capable of etching the particular exposed inorganic material. The supercritical component disclosed by Vaartstra is a gas that enters the supercritical state and becomes a supercritical fluid when the combination of pressure and temperature of the environment in which the gas is contained is above a critical state. Vaartstra discloses very high pressures (e.g., 7.38 MPa (72.8 atm) which translates into approximately 55328 Torr).

By contrast, claim 93 is directed to a method of processing a layer containing a high-permittivity material. The method includes modifying a layer containing a high-permittivity material by exposing the layer to a first process gas in a plasma. The method further includes etching the modified high-permittivity layer in the absence of a plasma by exposing the layer to a second process gas comprising an etch reactant.

Vaartstra fails to disclose, teach or suggest the subject matter of claim 93. Vaartstra discloses the use of a supercritical fluid, which requires high pressures. The pressures associated with the present invention are significantly lower (~10 Torr v. ~55000 Torr). There is no disclosure of either a first process gas or a gas in plasma, as set forth in claim 93.

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Vaartstra is silent in this regard. Instead, Vaartstra discloses that a supercritical fluid can be used either alone or with an etching composition. Furthermore, Vaartstra fails to disclose etching the modified high-permittivity layer in the absence of a plasma by exposing the layer to a second process gas comprising an etch reactant. Vaartstra does not disclose exposing the high permittivity layer to a first process gas and then a second process gas. The Office Action relies on the same passage in Vaartstra for allegedly teaching both the modifying and etching steps of the claimed invention. This is incorrect. Vaartstra only discloses that a supercritical fluid may be used either alone or with another component. Vaartstra does not disclose first modifying the layer containing the high permittivity layer and then etching the modified layer.

Accordingly, applicants respectfully submit that Vaartstra fails to disclose the subject matter of claim 93. Claims 94-104 and 106-119 depend from claim 93 and are allowable for at least the same reasons. Newly added claims 144-146 depend indirectly from claim 93 and are allowable over Vaartstra for at least the same reasons. Furthermore, Vaartstra fails to disclose the claimed chamber pressure of less than 10 Torr. Instead, Vaartstra discloses pressures over 55,000 Torr. Reconsideration and withdrawal of the rejection based upon Vaartstra are respectfully requested.

Claim 105 was rejected under 35 U.S.C. § 103(a) over Vaartstra in view of U.S. Patent No. 6,613,695 to Pomarede et al. ("Pomarede"). This rejection is respectfully traversed.

The Office Action correctly notes that Vaartstra fails to disclose a etching a variety of high dielectric constant materials. The Office Action relies on Pomarede for allegedly teaching this deficiency. Pomarede, however, fails to disclose, teach or suggest any of the deficiencies identified above in connection with claim 93. Accordingly, the combination of Vaartstra and Pomarede fails to render obvious the subject matter of any of claims 93-119 and 144-146. Reconsideration and withdrawal of the rejection based upon Vaartstra and Pomarede are respectfully requested.

27-Apr-2005 17:48

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703-905-2500

T-718 P-023/023 F-614

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Applicants respectfully submit that claims define subject matter that is patentable over the prior art cited of record. It is respectfully submitted that the application is in condition for allowance. Should further issues require resolution prior to allowance, the Examiner is requested to telephone applicants' undersigned attorney at the number below. Please charge any fees associated with the submission of this paper to Deposit Account Number 033975. The Commissioner for Patents is also authorized to credit any over payments to the above-referenced Deposit Account.

Respectfully submitted,

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Date: April 27, 2005
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